IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	§	
	§	
Ronald Scott Bunker	§	Group Art Unit: 1745
Serial No.: 10/064,808	§	
	§	Examiner: Thomas H. Parsons
Filed: August 20, 2002	§	
	§	
For: FUEL CELL ASSEMBLY AND THERMAL ENVIRONMENT CONTROL METHOD	§	Atty. Docket: 120478
	§	

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37 C.F.R. 1.8

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Date	Patrick Patnode

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on April 13, 2006, and received by the Patent Office on April 17, 2006.

The Commissioner is authorized to charge the requisite fee of $500.00, and any additional fees which may be necessary to advance prosecution of the present application, to Account No. 07-0868.

1. REAL PARTY IN INTEREST

The real party in interest is General Electric Company, the Assignee of the above-referenced application by virtue of the Assignment to General Electric Company by Ronald Scott Bunker recorded at reel 012999, frame 0747, and dated August 20, 2002. Accordingly, General Electric Company, as the parent company of the Assignee of the

above-referenced application, will be directly affected by the Board's decision in the pending appeal.

2. **RELATED APPEALS AND INTERFERENCES**

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. **STATUS OF CLAIMS**

Claims 1-31, 40 and 41 are currently pending, are currently under final rejection and, thus, are the subject of this Appeal.

4. **STATUS OF AMENDMENTS**

As the instant claims have not been amended at any time, there are no outstanding amendments to be considered by the Board.

5. **SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention relates generally to power generation equipment, such as fuel cells. *See* Application page 1, paragraph [0001]. More particularly, the disclosed system relates to thermal management of fuel cells, such as solid oxide fuel cells. *See id* at page 1, paragraph [0001].

The Application contains four independent claims, namely, claims 1, 21, 26 and 40, all of which are the subject of this Appeal. The subject matter of these claims is summarized below.

With regard to the aspect of the invention set forth in independent claim 1, 21 and 40, discussions of the recited features of claims 1 and 21 can be found at least in the below cited locations of the specification. By way of example, a fuel cell assembly 10 of the invention is described with reference to Fig. 3. As shown in Fig. 3, fuel cell assembly 10 includes a housing 80 having an inlet 90 and an outlet 100. Fuel cell assembly 10

further includes at least one fuel cell stack 220 disposed within the housing 80 and a control system 92. Housing 80 defines at least one bypass flow channel 110, which is configured to be in fluid communication with inlet 90. Inlet 90 and outlet 100 are configured to provide fluid communication to and from housing 80 respectively. *See e.g.*,page 4, lines 1-10. Fuel cell stack 220 defines at least one direct flow channel 230, which is configured to be in fluid communication with outlet 100. Fuel cell stack 220 includes at least one direct flow channel 230, which is configured to be in fluid communication with inlet 90 and outlet 100. Control system 92 is configured to control an oxidant flow from inlet 90 to direct and bypass channels 230, 110. *See e.g.*, page 4, lines 10-14.

With regard to the aspect of the invention set forth in independent claim 26, discussions of the recited features of claim 26 can be found at least in the below cited locations of the specification. By way of example, according to a particular embodiment, fuel cell 50 is a solid oxide fuel cell (SOFC). For this embodiment, housing 80 is a pressure vessel 80. *See e.g.*,page 4, line 20-23. Fuel cell stack 220 includes at least one fuel cell 50, as noted above and according to one embodiment, fuel cell stack 220 includes a number of planar fuel cells solid oxide fuel cell 50 arranged in a stack such as vertical stack, as indicated in a exemplary arrangement in Figure 3. for example. *See e.g.*,page 4, line 27-28 and page 5 lines 1-2.

A benefit of the invention, as illustrated in Figure 4, the thermal management system is configured to monitor a parameter value, such as temperature, compare the parameter value with a predetermined parameter value and generate a feedback signal output for actuating flow regulator 250. These steps are repeated to maintain operating thermal parameter value of the fuel cell assembly 10 within the prescribed limit or range.

This is a clear difference and distinction from the prior art, as discussed below.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

First Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's first ground of rejection in which the Examiner rejected claims 1-4, 9, 12, 13, 21-23, 25, 40 and 41under 35 U.S.C. § 103(a) as being unpatentable over JP 10-255827, in view of Spaeh.

Second Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's second ground of rejection in which the Examiner rejected claims 5 and 6 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of JP 249419.

Third Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's third ground of rejection in which the Examiner rejected claims 7 and 8 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of JP7-249419, and in still further view of "Appellant's admitted prior art."

Fourth Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's fourth ground of rejection in which the Examiner rejected claims 14 and 15 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of EP0374368.

Fifth Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's fifth ground of rejection in which the Examiner rejected Claim 16 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of Scheffler.

Sixth Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's sixth ground of rejection in which the Examiner rejected Claims 17, 19 and 20 under 35 USC

103(a) over JP 10-255827, in view of Spaeh, and in further view of "Appellant's admitted prior art."

Seventh Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's seventh ground of rejection in which the Examiner rejected Claim 18 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of "Appellant's admitted prior art," and in still further view of EP0374368.

Eighth Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's eighth ground of rejection in which the Examiner rejected Claims 26, 27, 30 and 31 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of "Appellant's admitted prior art," in still further view of EP 0374368.

Ninth Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's ninth ground of rejection in which the Examiner rejected Claims 28 and 29 under 35 USC 103(a) over JP 10-255827, Spaeh, "Appellant's admitted prior art," EP 0347368, and JP9-223512.

Tenth Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's tenth ground of rejection in which the Examiner rejected Claims 10, 11 and 24 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of Gillett. Appellants assumes that "Gillett" refers to US Patent No. 6,764,784.

7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents

and principles in rejecting the claims under Sections 103. Accordingly, Appellants respectfully request full and favorable consideration by the Board, as Appellants strongly believe that claims 1-31, 40 and 41 are currently in condition for allowance.

A. **Ground of Rejection No. 1:**

The Examiner rejected Examiner rejected claims 1-4, 9, 12, 13, 21-23, 25, 40 and 41under 35 U.S.C. § 103(a) as being unpatentable over JP 10-255827, in view of Spaeh. While the Examiner rejected each of independent claims 1, 21 and 40 on the basis of JP 10-255827, in view of Spaeh, each of these independent claims will be discussed separately below. Appellants respectfully traverse this rejection.

1. **Legal basis required to establish a *prima facie* case of obviousness.**

The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (B.P.A.I. 1979). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching or suggestion supporting the combination. *ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination includes all of the claimed elements, but also a convincing line of reason as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. *Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

2. **The Examiner's rejection of independent claims 1, 21 and 40 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Independent claim 1 recites:

> A fuel cell assembly comprising:
>
> a housing having an inlet and an outlet and defining at least one bypass flow channel, said bypass flow channel being configured to be in fluid communication with said inlet, said inlet and outlet being configured to provide fluid communication to and from said housing, respectively;
>
> at least one fuel cell stack disposed within said housing and defining at least one direct flow channel, said at least one fuel cell stack comprising at least one fuel cell, and said direct flow channel being configured to be in fluid communication with said inlet and outlet; and
>
> a control system, which is configured to control an oxidant flow from said inlet to said direct and bypass flow channels.

Independent claim 21 recites:

> A fuel cell assembly comprising:
>
> a housing having an inlet and an outlet, said inlet and outlet being configured to provide fluid communication to and from said housing, respectively;
>
> at least one bypass flow duct extending along said housing and configured to be in fluid communication with said inlet;
>
> at least one fuel cell stack disposed within said housing and defining at least one direct flow channel, said at least one fuel cell stack comprising at least one fuel cell, and said direct flow channel being configured to be in fluid communication with said inlet and outlet; and
>
> a control system, which is configured to control an oxidant flow from said inlet to said direct flow channel and said bypass flow duct.

Independent claim 40 recites:

> A fuel cell assembly comprising:
>
> a housing having an inlet and an outlet and defining at least one bypass flow channel, which is configured to be in fluid communication with said inlet and said outlet, said inlet and outlet being configured to provide fluid communication to and from said housing, respectively;
>
> at least one fuel cell stack disposed within said housing and defining at least one direct flow channel, said at least one fuel cell stack

comprising at least one fuel cell, and said direct flow channel being configured to be in fluid communication with said inlet and outlet; and

a control system, which is configured to control an oxidant flow through said direct and bypass flow channels.

a. ***Claims 1-4, 9, 12 and 13*:** Claim 1 is directed to a fuel cell assembly that includes a housing having an inlet and an outlet and defining at least one bypass flow channel. The bypass flow channel is configured to be in fluid communication with the inlet, and the inlet and outlet are configured to provide fluid communication to and from the housing, respectively. The fuel cell assembly further includes at least one fuel cell stack disposed within the housing and defining at least one direct flow channel. The fuel cell stack has at least one fuel cell, and the direct flow channel is configured to be in fluid communication with the inlet and outlet. The fuel cell assembly further includes a control system, which is configured to control an oxidant flow from the inlet to the direct and bypass flow channels.

Based on Appellant's understanding of the English language abstract and figures, JP 10-255827 employs a bypass control device 5 to stop power generation in a fuel cell for which an abnormality is detected. This is accomplished by controlling a bypass valve 8 so as to secure a passage of fuel gas by cooperating with cutoff operation of a fuel gas flow of a fuel cell on which abnormality is caused (Abstract) and by controlling an oxidizing gas bypass valve 9 to secure a passage of oxidizing gas by cooperating with a cutoff operation of an oxidizing gas flow control valve 7 (Abstract).

As noted on page 5 of the Office Action, JP 10-255827 does not disclose a housing defining at least one bypass channel, as recited by Claim 1. Appellant further notes that the Examiner has pointed to no teaching in JP 10-255827 of at least one direct flow channel that is defined by at least one fuel cell stack, where the direct flow channel is configured to be in fluid communication with an inlet and outlet of a housing, as recited by Claim 1. Based on Appellant's review of the English language abstract and figures, JP 10-255827 also fails to disclose this recitation of Claim 1.

Spaeh is cited to supply the former deficiency of JP 10-255827. Spaeh is directed to a device for generating energy. For the arrangement of Spaeh, supply air is guided by

means of a housing that is common to a plurality of fuel cell stacks and is not connected directly to the fuel cell stacks (Col. 1, lines 59-61). Appellant agrees that Spaeh discloses a housing with an inlet and an outlet. However, Appellant respectfully submits that Spaeh teaches away from several of the recitations of Claim 1. For example, Spaeh teaches away from the use of a direct flow channel configured to be in flow communication with the inlet and outlet, as recited by Claim 1. Instead, Spaeh teaches that the supply air is freely guided to the fuel cell stacks within the enclosure (Abstract, FIG. 1). Moreover, Spaeh also teaches away from the claimed control system, which is configured to control an oxidant flow from the inlet to the direct and bypass flow channels. Namely, Spaeh teaches that the supply air is freely guided to the fuel cell stacks (Abstract). The instant invention can not be arrived at by merely combining the teachings of Spaeh and JP 10-255827.

Further, the combination suggested by the Examiner appears to ignore the purpose of JP 10-255827, namely to stop power generation in a fuel cell for which an abnormality is detected. For example, it is not clear to Appellant whether replacing the oxidizing gas bypass valve 9 of JP 10-255827 with the guiding of supply air to the fuel cell stacks within the enclosure of Spaeh would render the resulting combination unsuitable for the purpose of JP 10-255827, namely stopping power generation in a fuel cell for which an abnormality is detected. Accordingly, Appellant respectfully submits that one skilled in the art would not modify JP 10-255827 in the manner suggested by the Examiner, as the proposed modification might render the system unsuitable for the intended purpose of JP 10-255827.

In addition, Appellant respectfully submits that even if one skilled in the art were motivated to combine the two references in the manner suggested by the Examiner, the Examiner has pointed to no teaching in the cited art suggesting that the resulting combination would include at least one direct flow channel that is defined by at least one fuel cell stack, where the direct flow channel is configured to be in fluid communication with an inlet and outlet of a housing, as recited by Claim 1.

In view of the above, Appellant respectfully submits that Claim 1 is patentably distinguishable over JP 10-255827 and Spaeh, either alone or in combination.

Further, as Claims 2-4, 9, 12 and 13 depend from Claim 1, these claims are also patentably distinguishable over the cited art for at least the reasons presented above with respect to Claim 1. Accordingly, Appellant respectfully requests that the rejections of Claims 1-4, 9, 12 and 13 under 35 USC 103(a) over JP 10-255827 and Spaeh be withdrawn.

b. ***Claims 21-23, 25:*** Similarly, independent Claim 21 is directed to a fuel cell assembly that includes in part a housing having an inlet and an outlet, where the inlet and outlet are configured to provide fluid communication to and from the housing, respectively. The fuel cell assembly further includes at least one bypass flow duct extending along the housing and configured to be in fluid communication with the inlet. The fuel cell assembly further includes at least one fuel cell stack disposed within the housing and defining at least one direct flow channel configured to be in fluid communication with the inlet and outlet.

As noted on page 8 of the Office Action, JP 10-255827 does not disclose a bypass flow duct extending along a housing, as recited by Claim 21. Spaeh is cited to supply this deficiency of JP 10-255827. However, Spaeh does not disclose a bypass duct extending along a housing, as recited by Claim 21. Rather, in Spaeh, supply air is guided freely by means of a housing (Col. 1, lines 59-61).

Moreover, Appellant respectfully submits that the Examiner has pointed to no teaching in JP 10-255827 of at least one direct flow channel defined by the at least one fuel cell stack and configured to be in fluid communication with the inlet and outlet, as recited by Claim 21. Further, Appellant submits that Spaeh teaches away from a direct flow channel defined by the at least one fuel cell stack, in that Spaeh teaches that the supply air should be guided freely by means of a housing (Abstract, FIG. 1). In addition, Appellant submits that one skilled in the art would not modify JP 10-255827 in the manner suggested by the Examiner, given that the proposed modification might render JP 10-255827 unsuitable for its stated purpose, namely to stop power generation in a fuel cell for which an abnormality is detected.

In view of the above, Appellant respectfully submits that Claim 21 is patentably distinguishable over JP 10-255827 and Spaeh, either alone or in combination. Further, as Claims 22, 23 and 25 depend from Claim 21, these claims are also patentably distinguishable over the cited art for at least the reasons presented above with respect to Claim 21. Accordingly, Appellant respectfully requests that the rejections of Claims 21, 22, 23 and 25 under 35 USC 103(a) over JP 10-255827 and Spaeh be withdrawn.

c. ***Claims 40 and 41:*** Claim 40 is directed to a fuel cell assembly that includes, in part, a housing having an inlet and an outlet and defining at least one bypass flow channel, which is configured to be in fluid communication with the inlet and the outlet, where the inlet and outlet are configured to provide fluid communication to and from the housing, respectively. The fuel cell assembly further includes at least one fuel cell stack disposed within the housing and defining at least one direct flow channel configured to be in fluid communication with the inlet and outlet.

As noted on page 8 of the Office Action, JP 10-255827 does not disclose a bypass flow channel defined by a housing, as recited by Claim 40. Spaeh is cited to supply this deficiency of JP 10-255827. However, Spaeh does not disclose a bypass flow channel defined by a housing, as recited by Claim 40. Rather, in Spaeh, supply air is guided freely by means of a housing that is common to a plurality of fuel cell stacks and is not connected directly to the fuel cell stacks (Col. 1, lines 59-61).

In addition, Appellant respectfully submits that the Examiner has pointed to no teaching in JP 10-255827 of at least one direct flow channel defined by at least one fuel cell stack and configured to be in fluid communication with the inlet and outlet, as recited by Claim 40. Further, Appellant submits that Spaeh teaches away from a direct flow channel defined by at least one fuel cell stack, in that Spaeh teaches that the supply air should be guided freely by means of a housing (Abstract, FIG. 1). Moreover, Appellant submits that one skilled in the art would not modify JP 10-255827 in the manner suggested by the Examiner, given that the proposed modification might render JP 10-255827 unsuitable for its stated purpose, namely to stop power generation in a fuel cell for which an abnormality is detected.

In view of the above, Appellant respectfully submits that Claim 40 is patentably distinguishable over JP 10-255827 and Spaeh, either alone or in combination. Further, as Claim 41 depends from Claim 40, these reasons apply to claim 41, as well. Accordingly, Appellant respectfully requests that the rejections of Claims 40 and 41 under 35 USC 103(a) over JP 10-255827 and Spaeh be withdrawn.

B. **Ground of Rejection No. 2:**

The Examiner rejected 5 and 6 stand rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of JP 249419. Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of dependent claims 5 and 6 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Claim 5 depends from Claim 1 and further recites that the control sensor is configured to monitor a parameter selected from the group consisting of temperature, voltage, electrical current, and heat flux. Claim 6 depends from Claim 5 and further recites that the control sensor comprises a temperature sensor. Appellant submits that the arguments presented above with respect to Claim 1 apply with equal force to dependent Claims 5 and 6.

On page 10 of the Office Action, the Examiner indicates that the English language abstract of JP 10-255827 does not disclose a control sensor configured to monitor a parameter selected from the group consisting of temperature, voltage, electrical current, and heat flux, as recited by Claim 5. JP 249419 is thus cited to supply the specific recitations of dependent Claims 5 and 6.

JP 249419 is directed to a fuel cell. When the temperature abnormally rises, the flow quantity control valve 69 arranged in the oxidant gas flow passage 6 is opened to increase the quantity of the oxidant gas. (Abstract) Although JP 249419 discusses a

bypass slot 62 (see for example paragraphs 29-30 and 61), as described with respect to FIG. 7, the bypass slot 62 appears to be formed within the fuel cell. Accordingly, Appellant submits that JP 249419 does not supply the above stated deficiencies of JP 10-255827 and Spaeh.

For at least these reasons, Appellant respectfully submits that Claims 5 and 6 are patentably distinguishable from the cited art, either alone or in combination. Accordingly, Appellant requests that the rejections of Claims 5 and 6 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claims 5 and 6.

C. **Ground of Rejection No. 3:**

The Examiner rejected Claims 7 and 8 stand rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of JP7-249419, and in still further view of "Appellant's admitted prior art." Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of dependent claims 7 and 8 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Claims 7 and 8 stand rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of JP7-249419, and in still further view of "Appellant's admitted prior art." Claim 7 depends from Claim 1 and further recites that the control sensor comprises an invasive temperature sensor, which is in intimate contact with a downstream control point. Similarly, Claim 8 depends from Claim 1 and further recites that the control sensor comprises a non-invasive temperature sensor, which is in remote communication with an upstream control point.

The reasons presented above with respect to Claims 1, 5 and 6 apply to Claims 7 and 8, as well. "Appellant's admitted prior art" does not supply the above- discussed deficiencies of 10-255827, Spaeh and JP7-249419,

In addition, Appellant wishes to address the remarks made on page 10 of the Office Action. Paragraph 25 of the present application explains that both invasive and non-invasive temperature sensors are known. However, Paragraph 25 does not suggest that the claimed use of such sensors is known. Accordingly, Appellant respectfully submits that the Examiner has not pointed to any specific teaching in the art to employ an invasive temperature sensor, which is in intimate contact with a downstream control point (Claim 7). Nor, has the Examiner pointed to any specific teaching in the art to employ a non-invasive temperature sensor, which is in remote communication with an upstream control point (Claim 8).

Accordingly, Appellant respectfully submits that Claims 7 and 8 are patentably distinguishable from the cited art, either alone or in combination. Accordingly, Appellant requests that the rejections of Claims 7 and 8 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claims 7 and 8.

D. **Ground of Rejection No. 4:**

The Examiner rejected Claims 14 and 15 stand rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of EP0374368. Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of dependent claims 14 and 15 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Claims 14 and 15 stand rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of EP0374368. Claims 14 and 15 depend from Claim 1. Claim 14 further recites that the housing is configured to be pressurized, and the inlet is configured to be in fluid communication with a preceding outlet of a turbine engine. Claim 15 further recites that the housing is configured to be pressurized, and the outlet is configured to be in fluid communication with a subsequent inlet of a turbine engine.

Appellant submits that the arguments presented above with respect to Claim 1 apply with equal force to dependent Claims 14 and 15.

The Examiner cites EP0374368 to supply the additional recitations of Claims 14 and 15. However, EP0374368 does not supply the above-described deficiencies of JP 10-255827 and Spaeh. In particular, although the Figure of EP0374368 shows flow of purge air around fuel cell stack 8, the air flow from compressor 10 is separate, and EP0374368 does not teach a control system, which is configured to control an oxidant flow from an inlet to direct and bypass flow channels, as is recited by Claim 1.

For at least these reasons, Appellant respectfully submits that Claims 14 and 15 are patentably distinguishable from the cited art, either alone or in combination. Accordingly, Appellant requests that the rejections of Claims 14 and 15 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claims 14 and 15.

E. **Ground of Rejection No. 5:**

The Examiner rejected Claim 16 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of Scheffler. Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of dependent claim 16 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Claim 16 has been rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of Scheffler. Claim 16 depends from Claim 1 and further recites that the bypass flow channel is configured to recycle at least a portion of the oxidant flow through the bypass flow channel to the inlet. As noted by the Examiner, JP 10-255827 and Spaeh do not teach or suggest a bypass flow channel, which is configured to recycle at least a portion of the oxidant flow through the bypass flow

channel to the inlet, as recited by Claim 16. Scheffler is cited to supply this deficiency of JP 10-255827.

Scheffler is directed to cathode flow control for a fuel cell power plant. Scheffler employs a cathode exhaust recirculating loop 24 for recirculating cathode exhaust. In contrast, the claimed bypass flow channel recycles at least a portion of the oxidant flow through the bypass flow channel to the inlet.

Appellant respectfully submits that Scheffler neither supplies the deficiencies of JP 10-255827 and Spaeh discussed above with respect to claim 1 nor discloses the additional recitation of Claim 16. For at least these reasons, Appellant respectfully submits that Claim 16 is patentably distinguishable from the cited art, either alone or in combination. Accordingly, Appellant requests that the rejection of Claim 16 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claim 16.

F. **Ground of Rejection No. 6:**

The Examiner rejected Claims 17, 19 and 20 stand rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of "Appellant's admitted prior art." Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of dependent claims 17, 19 and 20 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Claims 17, 19 and 20 stand rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of "Appellant's admitted prior art." Claims 17, 19 and 20 depend from Claim 1. Accordingly, the reasons presented above with respect to Claim 1 apply with equal force to these claims. Accordingly, Appellant respectfully submits that Claims 17, 19 and 20 are patentably distinguishable over the cited art. Accordingly, Appellant requests that the rejections of Claims 17, 19 and 20 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claims 17 , 19 and 20.

G. **Ground of Rejection No. 7:**

The Examiner rejected Claim 18 stands rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of "Appellant's admitted prior art," and in still further view of EP0374368. Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of dependent claim 18 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Claim 18 stands rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of "Appellant's admitted prior art," and in still further view of EP0374368. Claim 18 depends from Claim 1. The reasons presented above with respect to Claim 1 apply with equal force to Claim 18. Further, as discussed above with respect to Claims 14 and 15, EP0374368 does not supply the deficiencies of JP 10-255827 and Spaeh with respect to Claim 1, nor does "Appellant's admitted prior art." Accordingly, Appellant respectfully submits that Claim 18 is patentably distinguishable over the cited art, either alone or in combination. Accordingly, Appellant requests that the rejection of Claims 18 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claims 18.

H. **Ground of Rejection No. 8:**

The Examiner rejected Claims 26, 27, 30 and 31 under 35 USC 103(a) over JP 10-255827, in view of Spaeh, in further view of "Appellant's admitted prior art," in still further view of EP 0374368. Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of independent claim 26 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Independent claim 26 recites:

A solid oxide fuel cell assembly comprising:

a pressure vessel having an inlet and an outlet and defining at least one bypass flow channel, said bypass flow channel being configured to be in fluid communication with said inlet, said inlet and outlet being configured to provide fluid communication to and from said pressure vessel respectively;

lid oxide fuel cell stack disposed within said pressure vessel and defining at least one direct flow channel, said at least one planar solid oxide fuel cell stack comprising at least one planar solid oxide fuel cell, and said direct flow channel being configured to be in fluid communication with said inlet and outlet; and

a control system, which is configured to adjust an oxidant flow from said inlet to said direct and bypass flow channels in response to a feedback signal.

2. The Examiner's rejection of dependent claim 26 is improper because the rejection fails to establish a *prima facie* case of obviousness.

Independent Claim 26 is directed to a solid oxide fuel cell assembly including a pressure vessel having an inlet and an outlet and defining at least one bypass flow channel, the bypass flow channel being configured to be in fluid communication with the inlet, and the inlet and outlet being configured to provide fluid communication to and from the pressure vessel respectively. The solid oxide fuel cell assembly further including at least one planar solid oxide fuel cell stack disposed within the pressure vessel and defining at least one direct flow channel, the planar solid oxide fuel cell stack including at least one planar solid oxide fuel cell, and the direct flow channel being configured to be in fluid communication with the inlet and outlet. The solid oxide fuel cell assembly further including a control system, which is configured to adjust an oxidant flow from the inlet to the direct and bypass flow channels in response to a feedback signal.
For reasons similar to those presented above with respect to claim 1, Appellant submits that JP 10-255827 and Spaeh do not disclose, either alone or in combination, at least one bypass flow channel defined by a pressure vessel having an inlet and an outlet, the bypass flow channel being configured to be in fluid communication with the inlet, as recited by Claim 26. Nor do JP 10-255827 and Spaeh disclose at least one direct flow channel

defined by at least one planar solid oxide fuel cell stack and configured to be in fluid communication with the inlet and outlet, as recited by Claim 26.

The Examiner cites "Appellant's admitted prior art" for teachings of specific fuel cell types and this art does not supply the above discussed deficiencies of JP 10-255827 and Spaeh.

On page 14 of the Office Action, the Examiner notes that JP 10-255827 and Spaeh do not disclose a pressure vessel having an inlet and an outlet, and the inlet and outlet being configured to provide fluid communication to and from the pressure vessel respectively, as recited by claim 26. The Examiner cites EP 0374368 to supply this additional deficiency of JP 10-255827 and Spaeh. However, EP 0374368 does not disclose a bypass flow channel defined by a pressure vessel with a control system, which is configured to adjust an oxidant flow from the inlet to the direct and bypass flow channels in response to a feedback signal, as recited by Claim 26. For example, although the Figure of EP0374368 shows flow of purge air around fuel cell stack 8, the air flow from compressor 10 is separate and distinct from the flow of purge air from blower 18. (See Figure.)

For at least these reasons, Appellant respectfully submits that Claim 26 is patentably distinguishable over the cited art, either alone or in combination. Further, as Claims 27, 30 and 31 depend from Claim 26, these claims are also patentably distinguishable over the cited art for at least these reasons. In view of the above, Appellant requests that the rejections of Claims 26, 27, 30 and 31 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claims 26, 27, 30 and 31.

I. **Ground of Rejection No. 9:**

The Examiner rejected Claims 28 and 29 stand rejected under 35 USC 103(a) over JP 10-255827, Spaeh, "Appellant's admitted prior art," EP 0347368, and JP9-223512. Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of dependent claims 28 and 29 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

Claims 28 and 29 depend from Claim 26. The Examiner cites JP9-223512 to supply the temperature sensor recitation of Claim 28. However, JP9-223512 does not supply the above-discussed deficiencies of JP 10-255827, Spaeh, EP 0347368 and Appellant's admitted prior art. Accordingly, Appellant respectfully submits that Claims 28 and 29 are patentably distinguishable over the cited art, either alone or in combination. In view of the above, Appellant requests that the rejections of Claims 28 and 29 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claims 28 and 29.

J. **Ground of Rejection No. 10:**

Claims 10, 11 and 24 stand rejected under 35 USC 103(a) over JP 10-255827, in view of Spaeh, and in further view of Gillett. Appellants assumes that "Gillett" refers to US Patent No. 6,764,784. Appellants respectfully traverse this rejection.

1. **The Examiner's rejection of dependent claims 10,11 and 24 is improper because the rejection fails to establish a *prima facie* case of obviousness.**

a. ***Claim 10*:** Claim 10 depends from Claim 1 and further recites that bypass oxidant flow channel is defined by the fuel cell stack and the housing and extends along an inner surface of the housing. Appellant's arguments with respect to Claim 1 apply with equal force to dependent Claim 10. As noted on page 18 of the Office Action, JP 10-255827 and Spaeh do not disclose a bypass oxidant flow channel that is defined by the fuel cell stack and the housing and extends along an inner surface of the housing, as recited by claim 10. The Examiner cites Gillett as support for this additional deficiency of JP 10-255827 and Spaeh. However, although Gillett discusses ducting generally, Gillett does not disclose a bypass oxidant flow channel that extends along an inner surface of the housing.

b. ***Claim 11*****:** Claim 11 depends from claim 1 and further recites a flow liner disposed within the housing, where the bypass flow channel is disposed between the flow liner and the housing and extends along an inner surface of the housing. Appellant's arguments with respect to Claim 1 apply with equal force to dependent Claim 10. The Examiner cites Gillett as disclosing thermal insulation. However, Gillett does not disclose a bypass flow channel, which is disposed between a flow liner and a housing and which extends along an inner surface of the housing, as recited by Claim 11.

c. ***Claim 24*****:** Claim 24 depends from Claim 21 and further recites that the bypass flow duct is disposed within the housing. Appellant respectfully submits that Gillett does not disclose a bypass flow duct. Nor does Gillett supply the deficiencies of JP 10-255827 and Spaeh that are discussed above with respect to Claim 21.

In view of the above, Appellant respectfully submits that Claims 10, 11 and 24 are patentably distinguishable over the cited art, either alone or in combination. Accordingly, Appellant requests that the rejections of Claims 10, 11 and 24 under 35 USC 103(a) be withdrawn. As such, the Appellants respectfully request that the Board direct the Examiner to allow the claims 18.

Conclusion

Appellants respectfully submit that all pending claims are in condition for allowance. However, if the Examiner or Board wishes to resolve any other issues by way of a telephone conference, the Examiner or Board is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

Date: June 16, 2006

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8. **APPENDIX OF CLAIMS ON APPEAL**

Listing of Claims:

1. (Original) A fuel cell assembly comprising:

a housing having an inlet and an outlet and defining at least one bypass flow channel, said bypass flow channel being configured to be in fluid communication with said inlet, said inlet and outlet being configured to provide fluid communication to and from said housing, respectively;

at least one fuel cell stack disposed within said housing and defining at least one direct flow channel, said at least one fuel cell stack comprising at least one fuel cell, and said direct flow channel being configured to be in fluid communication with said inlet and outlet; and

a control system, which is configured to control an oxidant flow from said inlet to said direct and bypass flow channels.

2. (Original) The fuel cell assembly of Claim 1, wherein said bypass flow channel is further configured to be in fluid communication with said outlet.

3. (Original) The fuel cell assembly of Claim 2, wherein said control system is configured to adjust the oxidant flow to said direct and bypass flow channels in response to a feedback signal.

4. (Original) The fuel cell assembly of Claim 3, wherein said control system comprises:

at least one flow regulator, which is configured to regulate the oxidant flow to said direct and bypass flow channels;

a flow controller, which is configured to receive the feedback signal and to actuate said at least one flow regulator; and

at least one control sensor, which is configured to supply the feedback signal to said flow controller.

5. (Original) The fuel cell assembly of Claim 4, wherein said control sensor is configured to monitor a parameter selected from the group consisting of temperature, voltage, electrical current, and heat flux.

6. (Original) The fuel cell assembly of Claim 5, wherein said control sensor comprises a temperature sensor.

7. (Original) The fuel cell assembly of Claim 6, wherein said control sensor comprises an invasive temperature sensor, which is in intimate contact with a downstream control point.

8. (Original) The fuel cell assembly of Claim 7, wherein said control sensor comprises a non-invasive temperature sensor, which is in remote communication with an upstream control point.

9. (Original) The fuel cell assembly of Claim 4, wherein said flow regulator comprises at least one control valve.

10. (Original) The fuel cell assembly of Claim 2, wherein said bypass oxidant flow channel is defined by said fuel cell stack and said housing and extends along an inner surface of said housing.

11. (Original) The fuel cell assembly of Claim 2, further comprising a flow liner disposed within said housing, wherein said bypass flow channel is disposed between said flow liner and said housing and extends along an inner surface of said housing.

12. (Original) The fuel cell assembly of Claim 2, wherein said outlet is configured to be in fluid communication with a subsequent inlet of a subsequent fuel cell assembly.

13. (Original) The fuel cell assembly of Claim 2, wherein said inlet is configured to be in fluid communication with a preceding outlet of a preceding fuel cell assembly.

14. (Original) The fuel cell assembly of Claim 2, wherein said housing is configured to be pressurized, and wherein said inlet is configured to be in fluid communication with a preceding outlet of a turbine engine.

15. (Original) The fuel cell assembly of Claim 2, wherein said housing is configured to be pressurized, and wherein said outlet is configured to be in fluid communication with a subsequent inlet of a turbine engine.

16. (Original) The fuel cell assembly of Claim 1, wherein said bypass flow channel is configured to recycle at least a portion of the oxidant flow through said bypass flow channel to said inlet.

17. (Original) The fuel cell assembly of Claim 1, wherein each of said fuel cells is selected from the group consisting of a solid oxide fuel cell, a proton exchange membrane fuel cell, a molten carbonate fuel cell, a phosphoric acid fuel cell, an alkaline fuel cell, a direct methanol fuel cell, a regenerative fuel cell, a zinc air fuel cell, and a protonic ceramic fuel cell.

18. (Original) The fuel cell assembly of Claim 17, wherein said housing comprises a pressure vessel, and each of said fuel cells comprises a solid oxide fuel cell.

19. (Original) The fuel cell assembly of Claim 1, wherein said at least one fuel cell stack comprises a plurality of planar fuel cells arranged in a stack.

20. (Original) The fuel cell assembly of Claim 1, wherein said at least one fuel cell stack comprises a plurality of fuel cells arranged in a tubular configuration.

21. (Original) A fuel cell assembly comprising:

a housing having an inlet and an outlet, said inlet and outlet being configured to provide fluid communication to and from said housing, respectively;

at least one bypass flow duct extending along said housing and configured to be in fluid communication with said inlet;

at least one fuel cell stack disposed within said housing and defining at least one direct flow channel, said at least one fuel cell stack comprising at least one fuel cell, and said direct flow channel being configured to be in fluid communication with said inlet and outlet; and

a control system, which is configured to control an oxidant flow from said inlet to said direct flow channel and said bypass flow duct.

22. (Original) The fuel cell assembly of Claim 21, wherein said bypass flow duct is further configured to be in fluid communication with said outlet.

23. (Original) The fuel cell assembly of Claim 21, wherein said bypass flow duct extends along an outer wall of said housing.

24. (Original) The fuel cell assembly of Claim 21, wherein said bypass flow duct is disposed within said housing.

25. (Original) The fuel cell assembly of Claim 21, wherein the control system regulates the oxidant flow through said direct flow channel and said bypass flow duct in response to a feedback signal.

26. (Original) A solid oxide fuel cell assembly comprising:

a pressure vessel having an inlet and an outlet and defining at least one bypass flow channel, said bypass flow channel being configured to be in fluid communication with said inlet, said inlet and outlet being configured to provide fluid communication to and from said pressure vessel respectively;

at least one planar solid oxide fuel cell stack disposed within said pressure vessel and defining at least one direct flow channel, said at least one planar solid oxide fuel cell stack comprising at least one planar solid oxide fuel cell, and said direct flow channel being configured to be in fluid communication with said inlet and outlet; and

a control system, which is configured to adjust an oxidant flow from said inlet to said direct and bypass flow channels in response to a feedback signal.

27. (Original) The solid oxide fuel cell assembly of Claim 26, wherein said at least one planar solid oxide fuel cell stack comprises a plurality of planar solid oxide fuel cells arranged in a stack.

28. (Original) The solid oxide fuel cell assembly of Claim 26, wherein said control system comprises:

a flow regulator, which is configured to regulate the oxidant flow to said direct and bypass flow channels;

a flow controller, which is configured to communicate a temperature feedback signal and to actuate said at least one flow regulator, the feedback signal comprising the temperature feedback signal; and

at least one temperature sensor, which is configured to generate the temperature feedback signal from at least one control point and communicate the temperature feedback signal to said flow controller.

29. (Previously presented) The solid oxide fuel cell assembly of Claim 28, wherein said control system is further configured to repeatedly monitor the temperature feedback signals.

30. (Original) The fuel cell assembly of Claim 26, wherein said inlet is configured to be in fluid communication with a preceding outlet of a turbine engine.

31. (Original) The fuel cell assembly of Claim 26, wherein said outlet is configured to be in fluid communication with a subsequent inlet of a turbine engine.

32-39. (Cancelled)

40. (Original) A fuel cell assembly comprising:

a housing having an inlet and an outlet and defining at least one bypass flow channel, which is configured to be in fluid communication with said inlet and said outlet, said inlet and outlet being configured to provide fluid communication to and from said housing, respectively;

at least one fuel cell stack disposed within said housing and defining at least one direct flow channel, said at least one fuel cell stack comprising at least one fuel cell, and said direct flow channel being configured to be in fluid communication with said inlet and outlet; and

a control system, which is configured to control an oxidant flow through said direct and bypass flow channels.

41. (Original) The fuel cell assembly of Claim 40, wherein said control system comprises:

a plurality of flow regulators positioned upstream of said fuel cell stack, each of said flow regulators being configured to regulate the oxidant flow to said direct and bypass flow channels;

a flow controller, which is configured to receive a feedback signal and to actuate each of said flow regulators; and

at least one control sensor, which is configured to supply the feedback signal to said flow controller.

9. **APPENDIX OF EVIDENCE**

None.

10. **APPENDIX OF RELATED PROCEEDINGS**

None.